b) a[n elastic wall] first wall communicating with said heating side expansion chamber for pushing when a second fluid expands and a second wall communicating with said cooling side expansion chamber for pulling when a first fluid contracts [communicating with said chambers for expanding and contracting when said fluids expand or contract];

c) a means for shifting a weight off-center balance when said [elastic wall] first wall pushes and a second wall pulls [expands or contracts], allowing gravity to rotate the apparatus about said axis;

d) a heat source for expanding said fluids;

e) a cooling source for contracting said fluids; and

f) a structure for supporting said expansions chambers, heat and cooling source, and providing an output motion in a particular direction from the rotation of said apparatus.

45. (Amended) The heat engine as claimed in claim 39, wherein said expansion chamber [further comprises an internal baffle] is selected from the group consisting of a flexible membrane, an elastic membrane, a diaphragm and a bladder.

Remarks

The Applicant is appreciative of the time the Examiner spent in a telephone conversation on June 19, 2002, discussing this application with Applicant's Attorney.

The specification is amended to correct a typographical error at page 6 making the specification consistent with Figure 2. No new matter has been added to the specification.

Claim 1 has been amended to particularly point out and distinctly claim the novelty of the invention.

Claim 45 has been amended to particularly point out and distinctly claim the expansion chamber.

The Examiner rejected claims 1-9, 11-16, 18-28, 30-35, 37-50 and 52-78 under 35 U.S.C. Section 102(b) as being anticipated by Schur, U.S. Patent No. 4121420. Applicant respectfully traverses the application and points out to the Examiner the differences between the Applicant's present invention and the Schur invention.

Schur teaches an expansible chamber to vary the volume of a chamber. The expansible chamber is an assembly in the form of a bellows guided in one direction by a rod. The expansible chamber forces liquid to the opposite side of a cylinder creating an unbalance. The bellows is an annular structure, with inner/outer walls, that taper in a conical fashion wherein the walls are extensible only in a longitudinal direction. Walls that are extensible in a longitudinal direction are not necessarily inwardly or outwardly expandable or expandable perpendicular to the longitudinal direction of such a wall. Schur does not teach or suggest an expansible chamber where inner and outer walls are outwardly or inwardly expandable, that is, elastic/flexible convexly or concavely perpendicular to the longitudinal movement of the wall. Schur only teaches that the walls of the expansible chamber allow the volume of the chamber to change in a direction parallel to the movement of the rod (longitudinal direction) when the pressure changes in the chamber.

The Applicant's present invention teaches a first and second wall. Unlike Schur, the first and second walls do not expand/contract in the longitudinal direction of the wall relative to the pressure in the expansion chamber. The first and second wall are expandable in the convex and concave direction relative to the amount of pressure in the expansion chamber , that is,

inwardly/outwardly expandable perpendicular to the longitudinal direction of the wall. The chamber changes volume because of the inward and outward movement of the first and second wall. Furthermore, the Applicant's invention moves liquid or a piston creating an unbalance by the movement of the first and second wall. Consequently, Applicant believes that his invention is not anticipated by Schur.

Examiner rejected claims 1-78 under 35 U.S.C. Section 102(b) as being anticipated by Yates, U.S. Patent No. 4051678. Applicant respectfully traverses the application and points out to the Examiner the differences between the Applicant's present invention and the Yates invention.

Yates teaches a flexible diaphragm positioned in radially opposed tank pairs. A fluid expands/contracts the flexible diaphragm to push a liquid through a complex series of condensers and evaporators to shift weight creating an unbalance. It is the evaporation and condensation of the liquid that creates the shift in weight, not the actual movement of the liquid to the opposite side of the device. Yates does not teach or suggest a first wall that directly pushes and a second wall that directly pulls a weight acting like a piston to shift the weight creating an unbalance. Furthermore, Yates does not teach or suggest a first wall that directly pushes a liquid to an opposed second wall pulling the liquid wherein the direct weight shift of the liquid creates an unbalance.

The Applicant's present invention teaches a heat engine rotates by shifting weight to create an unbalance. Unlike Yates, the unbalance occurs when weights in a piston like manner are moved radially inward and outward from the center of the heat engine. The weights are moved by a first wall that moves inwardly and a second wall that moves outwardly when a

second fluid expands and a first fluid contracts. Alternately, a first wall moves inwardly and an opposed second wall moves outwardly when a second fluid expands and a first fluid contracts directly pushing a liquid to create an unbalance. Consequently, Applicant believes that his invention is not anticipated by Yates.

Examiner rejected claims 1-78 under 35 U.S.C. Section 102(b) as being anticipated by Morgan, U.S. Patent No. 4074534. Applicant respectfully traverses the application and points out to the Examiner the differences between the Applicant's present invention and the Morgan invention.

Morgan teaches a flexible diaphragm forming an inner and outer chamber that is connected to an opposing flexible diaphragm that forms an opposing inner and outer chamber. The opposing inner chambers are liquidly connected. The outer chambers contain a volatile liquid that when heated produce a significant pressure. This significant pressure is required to distend the flexible diaphragm. When the volatile liquid is heated its vapor pressure distends the diaphragm pushing the liquid to the opposite side, wherein the volatile liquid on the opposing side is cooled significantly reducing its pressure and distending the diaphragm in the opposite direction to receive the liquid. The volatile liquid must be fully volatized on the heating side to move enough liquid to the opposite inner chamber. The volatile liquid must be fully condensed on the cooling side such that there is no opposition to the distention of the diaphragm. The movement of the liquid to shift the weight of the liquid, creating an unbalance, only occurs if a volatile liquid is used. Morgan does not teach or suggest a first wall that pushes a fluid and a second wall that pulls a fluid moving a weight acting like a piston to shift the weight creating an unbalance. Furthermore, Morgan does not teach or suggest a first wall that pushes a fluid to an

opposed second wall by means of a non-volatile fluid or liquid. Morgan teaches only by heating a volatile liquid is there enough pressure produced to distend the flexible diaphragm wherein moving the liquid will create an unbalance.

The Applicant's present invention teaches a heat engine rotates when shifting the weight of a liquid by a first wall that expands under pressure and a second wall that contracts under lack of pressure created by heat/cooling a non-volatile or regular fluid. Unlike Morgan, the unbalance occurs when weights in a piston like manner are moved radially inward and outward from the center of the heat engine. The weights are moved by a first wall that moves inwardly and a second wall that moves outwardly when a non-volatile second fluid expands and a non-volatile first fluid contracts in an expansion chamber. Alternately, a first wall moves inwardly and an opposed second wall moves outwardly when a non-volatile second fluid expands and a non-volatile first fluid contracts directly pushing a liquid to create an unbalance. The non-volatile fluids are either a same gas, or same liquid or both in the expansion chambers. The non-volatile fluid distending the first and second wall is not a volatile liquid that must be fully volatilized and condensed to distend the first and second wall. Consequently, Applicant believes that his invention is not anticipated by Morgan.

The Examiner noted prior art made of record and not relied upon but considered pertinent to the Applicant's disclosure. Allen, Lapeyre and Yoo et al disclose heat engines comprising tanks to create off center balance to rotate the apparatus.

The Applicant notes that Allen teaches an apparatus that creates an off center balance through direct contact of a volatile fluid in a condensed state with a heavy fluid to vaporize the

volatile fluid. There is no first and second wall in a chamber pushing a fluid to create an unbalance.

The Applicant notes that Lapeyre teaches a bellows that expands/contracts similar to the teachings in Schur. There is no first and second wall in a chamber pushing a fluid to create an unbalance.

The Applicant notes that Yoo et al teaches an inlet and outlet valve that allows fluid to move creating a shift in fluid weight and an unbalance. There is no first and second wall in a chamber pushing a fluid to create an unbalance.

Applicant believes that the elected set of claims is in condition for allowance and earnestly requests that the claims pass to issue. If the Examiner believes that contact with Applicant's attorney would aid in the examination of the application, the Examiner is requested to contact Applicant's attorney at the telephone number listed below. The Examiner is hereby authorized to charge any required fees not included herewith to Deposit Account 501-546.

Date: June 21, 2002

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with a third fluid 42, and heating-side chamber 33 being emptied of a third fluid 42, allows gravity to rotate element 43, when the heat 38 is applied, by shifting the weight of the fluids off-balance. The element 43 rotates counter-clockwise 31 when the heat 38 supply is mounted on one side of the apparatus 30 structure 44. A practitioner in the art can readily understand the heat engine will rotate clockwise if the heat 38 supply is mounted on the opposite side of the apparatus 30 structure 44. Finally, channel 41 is a tube, pipe or hose connecting the heating-side chamber 33 to cooling-side chamber 32.

The apparatus 30 includes cooling-side chamber 32 and heating-side chamber 33 solidly connected 36 to element 43 that rotates around axis 34 using rotating connection 45 that communicates with structure 44. A channel 41 that carries a third fluid 42 between the chambers interconnects the cooling-side chamber 32 and heating-side chamber 33. The first wall 35 of heating-side chamber 33 and second wall 40 of cooling-side chamber 32 are a plurality of devices including but not limited to an elastic membrane, diaphragm, and bladder, or a flexible membrane, diaphragm and bladder. The second fluid 40 in heating-side chamber 33 and the first fluid 39 in cooling-side chamber 32 are highly expandable gases when heated with air being the preferred gas. However, the first fluid 39 and second fluid 40 can also be a highly expandable liquid. The third fluid 42 is a non-compressible liquid that travels from heating-side chamber 33 to cooling-side chamber 32, when a heat 38 source is applied, as a result of the expansion of the first wall 35 and contraction of the second wall 46. A practitioner in the art readily understands that heat 38 is received from a plurality of sources including but not limited to solar energy, gas combustion, electric